

More specifically, the Examiner states that "[t]he phrase 'between about 0.0005 and 0.0003 inches' recited in claims 1 and 15 (line 4) is indefinite since it is not clear whether 0.0005 and 0.003 inches are included in the range."

Applicants have amended Claims 1 and 15 to delete the limitation "about" therefrom. It is respectfully submitted that this rejection has been overcome.

The Examiner rejected Claim 17 as being indefinite since, according to the Examiner, it is unclear how the cube corner prisms diffract essentially all retroreflected light.

Applicants have amended Claim 17, as set out above, to recite that the cube corner prisms diffract essentially all incoming light. It is respectfully submitted that this rejection has been overcome as well.

Accordingly, dependent Claims 3-8 and 18 depend from Claims 1 and 17, which are now believed to comply with 35 U.S.C. § 112, second paragraph.

Claim Rejections under 35 U.S.C. § 102

The Examiner rejected Claims 1, 3, 5, 7-8, and 15-16 under 35 U.S.C. § 102(b) as being anticipated by Van Arnam (U.S. Pat. No. 4,243,618). The Examiner states that Van Arnam at column 7, lines 1-4 "discloses cube corner trigonal pyramids having a size of about 0.003 to about 0.015 inch along the side of the base of the pyramids." The rejection is respectfully traversed in view of the amendments to the base Claims 1 and 15.

More specifically, Claims 1 and 15 have been amended to delete the limitation "about" therefrom. It is Applicants' position that the upper end of the claimed range 0.003 is not included therein and thus Van Arnam does not anticipate Claims 1 and 15. Van Arnam also fails to teach or suggest a reflective coating adhered to the facets as recited by Claims 1 and 15. Furthermore, Claim 1 had been amended to recite a 0.33 degree angle of observation, uniform orientation-free cone of retroreflected light. This limitation is neither taught nor suggested by Van Arnam. Similarly, Claim 15 recites a 0.5 degree angle of observation, uniform orientation-free cone of retroreflected light which is neither taught nor suggested by Van Arnam.

Accordingly, it is respectfully submitted that Claims 1 and 15 patentably distinguish over Van Arnem. Claims 3, 5, 7-8, and 16 depend from Claims 1 and 15 and thus include the limitations not anticipated by Van Arnem.

The present claimed invention provides unexpected results of having essentially no change in the retroreflected brightness by the structure having prisms with a dihedral angle of 90° having a dihedral angle deviation in the range from -1.04 minutes to 3.67 minutes. This is attributable to the fact that there is greater diffraction spreading of the returned retroreflected light with the smaller pitched prisms. In contrast, the same dihedral angle of 90° having the same range of dihedral angle deviation in larger pitch prisms (e.g., 0.006" pitch) can result in a change of fifty percent of the brightness.

This uniformity of retroreflected brightness of the present invention despite the dihedral angle deviation provides a number of immediate advantages including: allowing some latitude in the manufacturing process such that the prisms can be manufactured at much higher speeds and with less material; retroreflecting the same brightness despite distortion of the prisms due to temperature variations and the like; and allowing small pitched prisms with metal backing to satisfy the angle of observation performance desired for some applications.

Furthermore, the diffraction effect of the claimed smaller pitched prisms despite the dihedral angle change results in a uniform orientation-free retroreflected light resulting in a much safer product that do not leave dark areas in the retroreflected light distribution. In contrast, larger prisms return six well-collimated beams that do not converge leaving dark areas in a narrow observation angle, such as 0.33° , and, hence, an unsafer product.

The claimed range of prism sizes, which is smaller than the cited prior art, provides a number of important advantages. The prisms are stressed less during manufacture and distortion of the structure. Also, the smaller prisms allow the total thickness of the structure to be reduced while increasing flexibility which is a very desirable feature.

Additionally, the claimed range of prism sizes beneficially avoids an undesirable scattering effect (i.e., the impinging light is not retroreflected by the prisms but rather scattered because the prisms are too small) that occurs in exceptionally small prisms.

C

The Examiner rejected Claims 17-18 under 35 U.S.C. § 102(b) as being anticipated by Stamm (U.S. Pat. No. 3,712,706). The rejection is respectfully traversed.

Stamm discloses, for example, at column 3, line 65 through column 4, line 2, that the cube corners are configured so that the angular divergence of the retroreflected light attributable to diffraction is the dominant diverging factor. Applicants respectfully suggest that this does not anticipate the claimed invention of Claim 17 which recites that the cube corner prisms "diffract essentially all incoming light". Claim 18 depends from Claim 17 and thus includes this patentable distinction.

Therefore, Applicants' claimed invention meets the requisites of 35 U.S.C. § 102 in view of Stamm.

The Examiner rejected Claims 1-3, 5-8, and 15-18 under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 5,780,140 to Nilsen.

Applicants have claimed priority under 35 U.S.C. § 120 to the filing date of the '140 Nilsen patent. The specification has been amended herein to reference the '140 Nilsen patent. Enclosed herewith is a newly executed Declaration/Power of Attorney signed by the inventors claiming priority to the filing date of the '140 Nilsen patent. It is noted that there is common ownership (Reflexite Corporation) between the '140 Nilsen patent and the present application. Accordingly, it is respectfully submitted that the '140 Nilsen patent has been removed as a reference.

Rejection under 35 U.S.C. § 103(a)

The Examiner rejected Claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Van Arnem in view of U.S. Pat. No. 5,558,740 (the '740 Patent). The rejection is respectfully traversed.

Although the '740 Patent discloses the concept of seaming together several prism arrays, it does not provide the limitations of amended Claim 1 not disclosed in Van Arnem as described

C

above. Thus, the two references taken individually, or in combination, do not teach all the limitations of Claim 4.

The Examiner rejected Claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Van Arnam in view of Walter (U.S. Pat. No. 5,171,624).

Although Walter discloses the concept of tilting cube corner elements, it does not provide the limitations of amended Claim 1 not disclosed in Van Arnam as described above. Thus, the two references taken individually, or in combination, do not teach all the limitations of Claim 6.

SUMMARY AND CONCLUSIONS

Applicants have amended the claims to comply with 35 U.S.C. § 112, second paragraph. Applicants' amended claimed invention is not anticipated by Van Arnam or Stamm under 35 U.S.C. § 102(b). The '140 Nilsen patent has been removed as a reference under 35 U.S.C. § 120. Applicants' claimed invention is not obvious under 35 U.S.C. § 103 in view of the cited references, either individually or in combination. Reconsideration and withdrawal of the rejection of the claims are requested.

If a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By Erik L. Ence
Erik L. Ence
Registration No. 42,511
Telephone (781) 861-6240
Facsimile (781) 861-9540

Dated: April 28, 2000
Lexington, Massachusetts 02421-4799

C